



PTO/SB/21 (08-03)

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Application Number	10/661,831
Filing Date	September 12, 2003
First Named Inventor	Qing Hu
Art Unit	N/A
Examiner Name	Not Yet Assigned
Attorney Docket Number	101328-0178

## ENCLOSURES (Check all that apply)

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Remarks

## SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	NUTTER MCCLENNEN & FISH LLP Reza Mollaaghababa
Signature	
Date	Feb. 25, 2004

### Transmittal

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Dated: Feb. 25, 2004 Signature: *[Signature]*  
(Reza Mollaaghababa)

Docket No.: 101328-0178  
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:  
Qing Hu, et al.

Application No.: 10/661,831

Filed: September 12, 2003

Art Unit: N/A

For: TERAHERTZ LASERS AND AMPLIFIERS  
BASED ON RESONANT OPTICAL  
PHONON SCATTERING TO ACHIEVE  
POPULATION INVERSION

Examiner: Not Yet Assigned

**INFORMATION DISCLOSURE STATEMENT (IDS)**

Commissioner for Patents  
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Dear Sir:

Pursuant to 37 CFR 1.56, 1.97 and 1.98, the attention of the Patent and Trademark Office is hereby directed to the references listed on the attached PTO/SB/08. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the references be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

This Information Disclosure Statement is filed before the mailing date of a first Office Action on the merits as far as is known to the undersigned (37 CFR 1.97(b)(3)).

A copy of each reference on PTO/SB/08 is attached.

In accordance with 37 CFR 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made or that no other material information as defined in 37 CFR 1.56(a) exists. In accordance with 37 CFR 1.97(h), the filing of this Information Disclosure statement shall not be construed to be an admission that any patent,

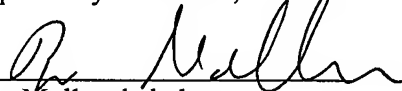
publication or other information referred to therein is "prior art" for this invention unless specifically designated as such.

It is submitted that the Information Disclosure Statement is in compliance with 37 CFR 1.98 and the Examiner is respectfully requested to consider the listed references.

The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 141449, under Order No. 101328-0178. A duplicate copy of this paper is enclosed.

Dated: Feb. 25, 2004

Respectfully submitted,

By 

Reza Mollaaghababa

Registration No.: 43,810

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				Application Number	10/661,831
				Filing Date	September 12, 2003
				First Named Inventor	Qing Hu
				Art Unit	N/A
				Examiner Name	Not Yet Assigned
Sheet	1	of	2	Attorney Docket Number	101328-0178

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. <sup>1</sup>	Document Number Number-Kind Code <sup>2</sup> (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	AA	US-6,144,679	11-07-2000	Herman, et al.	
	AB	US-6,563,622-B2	05-13-2003	Mueller, et al.	
	AC	US-5,936,989	08-10-1999	Capasso, et al.	
	AD	US-5,745,516	04-28-1998	Capasso, et al.	
	AE	US-5,509,025	04-16-1996	Capasso, et al.	
	AF	US-5,457,709	10-10-1995	Capasso, et al.	
	AG	US-6,188,477-B1	02-13-2001	Pu, et al.	
	AH	US-6,154,475	11-28-2000	Soref, et al.	
	AI	US-6,370,219-B1	04-09-2002	Peale	
	AJ	US-6,472,683-B1	10-29-2002	Li	

FOREIGN PATENT DOCUMENTS					
Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

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NON PATENT LITERATURE DOCUMENTS				
Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.		
	CA	Kazarinov and Suris, "Possibility of the amplification of electromagnetic waves in a semiconductor and superlattice," Sov. Phys. Semicond. 5, 707 (1971)		
	CB	Faist, et al., "Quantum cascade laser," Science 264, 477 (1994)		
	CC	Beck, et al., "Continuous Wave Operations of a Mid-infrared Semiconductor Laser at Room Temperature," Science 295, 301 (2002)		
	CD	Helm, et al., "Intersubband Emission from Semiconductor Superlattices Excited by Sequential Resonant Tunneling," Phys. Rev. Lett. 63, 74 (1989)		
	CE	Kohler, et al., "Terehertz semiconductor-heterostructure laser," Nature, 417, 156 (2002)		
	CF	Tredicucci et al. "High performance interminiband quantum cascade lasers with graded superlattice," Appl. Phys. Letter. 73, 2101 (1998)		
	CG	Rochat, et al., "Low-threshold terahertz quantum-cascade lasers," Appl. Phys. Lett. 81, 1381 (2002)		
	CH	Williams, et al., "3.4-THz quantum cascade laser based on Longitudinal-optical-phonon scattering for depopulation," Appl. Phys., Lett. 82, 1015 (2003). Also published in Virtual Journal of Nanoscale Science & Technology, 7(8) (2003)		
	CI	Unterrainer, et al., "Quantum cascade lasers with double metal-semiconductor waveguide resonators," Appl. Phys. Lett. 80, 3060 (2002)		

Examiner Signature	Date Considered
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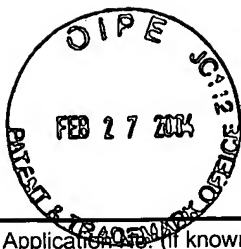
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				Art Unit	N/A
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Sheet	2	of	2	Attorney Docket Number	101328-0178

CJ	Lee, et al., "Au-In bonding below the eutectic temperature," IEEE Trans. Comp, Hybrids, Manuf. Technol. 16, 311 (1993)	
CK	Wang, et al., "Die bonding with Au/In isothermal solidification technique," J. Electron. Mat. 29, 443 (2000)	
CL	Wang, et al., "Stable and shallow PdIn ohmic contacts to n-GaAs," Appl. Phys. Lett. 56, 2129 (1990)	
CM	Trocconi, et al., "Mid-infrared (n = 7.4 um) quantum cascade laser amplifier for high power single-mode emission and improved beam quality," Appl. Phys. Lett. 80, 4103 (2002)	
CN	Mueller, et al., "2.5 THz Laser Local Oscillator for the EOS Chem 1 Satellite," Proceedings of the Ninth International Space Terahertz Technology Symposium, pp. 563-572, Pasadena, CA, March 17-19 (1998)	
CO	Williams, et al., "Narrow-linewidth terahertz intersubband emission from three-level systems," American Institute of Physics (1999)	
CP	Williams and Hu, "Optimized energy separation for phonon scattering in three-level terahertz intersubband lasers," American Institute of Physics (2001)	
CQ	Xu and Hu, "Electrically pumped tunable terahertz emitter based on intersubband transition," American Institute of Physics (1997)	
CR	Faist, et al., "Bound-to-Continuum and Two-Phonon Resonance Quantum-Cascade Lasers for High Duty Cycle, High-Temperature Operation," IEEE (2002)	

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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Application No. (if known): 10/661,831

Attorney Docket No.: 101328-0178

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IDS (Citation) by Applicant

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